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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/719,721	12/16/2000	Joji Yoshimura	2013/19	3612

7590 03/23/2005

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EXAMINER	
TSANG FOSTER, SUSY N	

ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 03/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/719,721	YOSHIMURA ET AL.	
	Examiner	Art Unit	
	Susy N Tsang-Foster	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 December 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-7,9,11,16,19,20,27 and 28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-7,9,11,16,19,20,27 and 28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office Action is responsive to the amendment filed on 12/16/2004. Claims 27 and 28 have been amended. Claims 1, 8, 10, 12-15, 17, 18, and 21-26 have been cancelled. Claims 2-7, 9, 11, 16, 19, 20, 27, and 28 are pending and are finally rejected for reasons necessitated by applicant's amendment.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 2-7, 9, 11, 16, 19, 20, 27, and 28 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Yoshimura et al. (US 6,291,094 B1).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Yoshimura et al. disclose a gas separator in the form of a bipolar plate for supplying and discharging fuel and an oxidizing agent in a fuel cell stack (col. 4, lines 48-61). The gas separator comprises two base metal plates 65 and 66 having predetermined corrugations (rugged shapes) formed by mechanically pressing thin stainless steel plates in step S100 (see Figures 4-11 and col. 6, line 6 to col. 16, line 35 of the reference, specifically col. 6, lines 15-17) and that in step 130, the base sheets 65 and 66 are joined face to face to complete separator 64 by employing an adhesive such as an electrically conductive paste which is a member (the electrically conductive adhesive) located in a space defined between the two plates and bonding the two plates together (col. 7, lines 9-14). The two base metal plates can also be made of aluminum (col. 8, lines 29-45). The electrically conductive paste is also inherently thermally conductive to some degree because an electrical conductor is not a thermal insulator. As seen in

Figure 3, the fuel cell is constructed as a laminate of plural layers including electrolyte layers and electrode layers and the gas separator being adapted to form one of the plural layers. The corrugations in each plate are adapted to define at least part of a flow path of reactant gases (fluids) passing inside the fuel cell (col. 4, lines 24-36).

Yoshimura et al. also disclose that the concavities defined by the inner surfaces of the predetermined corrugations can be filled with an electrically conductive material such as carbon paste in order to further increase the electric conductivity of the gas separator (col. 13, lines 54-63).

Applicant on page 28 of the instant specification states that in the case of where the thermally expanding graphite or any electrically conductive paste is used for the filler, the filler itself has integrity to allow the two metal plates to be readily bonded to each other by pressing and that electrically conductive pastes include adhesives containing carbon powder.

Since carbon paste is an electrically conductive adhesive as recognized by applicant on page 28 of the instant specification and those of ordinary skill in the art, the carbon paste inherently bonds the two plates of the gas separator to one another. Furthermore, applicant himself states on page 28 of the instant specification that electrically conductive pastes are adhesives containing carbon powder (i.e. carbon paste).

The court has held that claiming of a property or characteristic which is inherently present in the prior art does not necessarily make the claim patentable. *In re Best*, 562 F.2d 1252, 1254, 195 USPQ 430, 433 (CCPA 1977). See also MPEP 2112 and 2112.01. When the Examiner has provided a sound basis for believing that the products of the applicant and the prior

art are the same, the burden of proof is shifted to the applicant to prove that the product shown in the prior art does not possess the characteristics of the claimed product. *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

It is noted that in claim 5 drawn to a gas separator, the limitation "wherein the fluid includes one of a hydrogen containing gaseous fuel, an oxygen containing oxidizing gas, and a cooling fluid for cooling down the inside of the fuel cell" is not given patentable weight because these fluids do not structurally limit the gas separator. Nevertheless, the fluid can be reactant gas fuels such as hydrogen and oxygen as stated in the paragraph above.

Figure 6 of the reference shows in examples (b) and (c) gas separators that are not coated with the second coating layer of thermal expansion graphite coating such that the gas separators have only the first coating layer of either tin or nickel as shown in Figure 6 and as discussed in col. 10, lines 3-30 of the reference. In Figure 7, a fuel cell uses only a gas separator coated with a single tin layer and not with a second layer of thermal expansion graphite (col. 10, lines 31-45).

5. Claims 2-5, 7, and 27 are rejected under 35 U.S.C. 102(e) as being anticipated by Cisar et al. (US 6,426,161 B1).

Cisar et al disclose a gas separator for fuel cell stack, the gas separator comprising two plates (the nickel coated layers), each of the two plates defining rugged shape on one face thereof, each of the two plates (nickel layers) further being bonded to one another through a member (the aluminum coupon) located in the space defined between the two plates and bonding

the two plates together (see Figure 2, col. 1, line 65 to col. 2, line 4; col. 4, lines 15-61; column 5, line 60 to col. 6, line 67). The two plates (nickel plated layers) are further coated with a single outermost layer of gold (see Figure 2 and col. 6, lines 65-67). The member made of aluminum is electrically and thermally conductive.

Cisar et al. also disclose that there is excellent adhesion between the deposited metal layers and aluminum alloy substrates (the filler member) (col. 7, lines 30-47).

As seen in Figure 2 of Cisar et al., the aluminum alloy substrate fills the concavities of the metal plated layers.

It is noted that in claim 5 drawn to a gas separator, the limitation "wherein the fluid includes one of a hydrogen containing gaseous fuel, an oxygen containing oxidizing gas, and a cooling fluid for cooling down the inside of the fuel cell" is not given patentable weight because these fluids do not structurally limit the gas separator. Nevertheless, the reference discloses that the gas separators are positioned between adjacent electrochemical cells.

The gas separator of Cisar et al. meets the structural limitations of the instant product claims.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cisar et al. (US 6,426,161 B1) in view of Walsh (US 6,096,450).

Cisar et al. disclose all the limitations of claim 5 except that a cooling fluid for cooling down the inside of the fuel cells is introduced as a fluid passing through one of the flow path defined by the rugged shapes on one surface of the gas separator. Cisar et al. disclose that the gas separator is a bipolar plate for supplying and discharging fuel and an oxidizing agent (see col. 2, lines 16-30).

Walsh teaches that a fluid flow plate for a fuel cell may be bipolar, monopolar, combined monopolar such as an anode cooler or cathode cooler, or a cooling plate and that flow channels of the fluid flow plate can carry reactant gases, as well as liquid and the function of the fluid flow plate is a matter of design choice for a fuel cell system (col. 5, lines 35-45 and col. 9, lines 64-67 and col. 10, lines 1-16).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the gas separator plate of Cisar et al. as a cathode or anode cooling plate having cooling fluid for cooling down the inside of the fuel cells because cooling of a fuel cell stack is necessary for proper temperature maintenance of a fuel cell stack during normal operation and gas separator plates (flow field plates) in the fuel cell art are adaptable for a variety of uses such as a bipolar, monopolar, combined monopolar such as an anode cooler or cathode cooler, or a cooling plate depending on the requirements of a fuel cell system.

8. Claims 2-5, 7, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilkinson et al. (US 5,521,018) in view of Adlhart (US Pat. No. 4,175,165).

Wilkinson et al. disclose a gas separator for a fuel cell wherein two plates of graphite foil are laminated with a metal foil layer interposed between the two plates of graphite foil (see abstract; Figures 5a, 5b, 7a and 7b; col. 5, lines 29-35). The lamination bonds the two plates of graphite foil and the metal foil layer with one another. Wilkinson et al. also disclose that graphite foils comprise an embossed surface (rugged shapes) (col. 6, lines 37-56).

Wilkinson et al. also disclose that other suitable electrically conductive material sufficiently soft so as to permit embossing can be used as the two outer layers of the separator such as corrosion resistant metals such as niobium and somewhat corrosive resistant metals such as copper (col. 10, lines 24-39). The gas separator may be used as a flow field plate for fuel or oxidant or coolant (col. 11, lines 15-39 and col. 12, lines 10-34). The intermediate metal foil layer is effective to bond the two outer layers of soft, electrically conductive metal layers such as copper and niobium through embossing. The embossing step provides for concavities that are filled by the intermediate metal foil layer.

Wilkinson et al. do not disclose at least one of the plates of the gas separator has a single outer coat layer.

Adlhart teach providing a single coat layer of a wetting agent to the surfaces of the gas separator in order to render the grooves (rugged shapes) hydrophilic which remove water from the fuel cell produced during the operation of the fuel cell to prevent fuel cell flooding (col. 6, lines 3-22).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a single outer coat layer of a wetting agent to the surfaces of the gas separator of Wilkinson et al. in order to render the rugged shapes plates hydrophilic which would remove water from the fuel cell produced during the operation of the fuel cell to prevent fuel cell flooding (col. 6, lines 3-22).

9. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilkinson et al. (US 5,521,018) in view of Adlhart (US Pat. No. 4,175,165) as applied to claim 4 above, and further in view of Cisar et al. (US 6,146,780).

Wilkinson et al. in combination with Adlhart teach all the limitations of claim 6 except that the two plates are composed of stainless steel.

Wilkinson et al. also teaches that the two plates are suitably electrically conductive material sufficiently soft so as to permit embossing can be used such as corrosion resistant metals such as niobium and somewhat corrosive resistant metals such as copper (col. 10, lines 24-39).

Cisar et al. teach that bipolar separator plates are typically made from a variety of metals such as stainless steel (col. 1, lines 15-20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the two plates of the separator of Wilkinson et al to be made of stainless steel because stainless steel is a corrosion resistant metal for a fuel cell system.

10. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilkinson et al. (US 5,521,018) in view of Adlhart (US Pat. No. 4,175,165) as applied to claim 4 above, and further in view of Wilson et al. (US 6,037,072) .

Wilkinson et al. in combination with Adlhart teach all the limitations of claim 6 except that the two plates are composed of aluminum.

Wilson teaches a bipolar separator plate made of aluminum that adequately withdraws heat from a fuel cell (col. 2, lines 39-46).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the two plates of the separator of Wilkinson et al to be made of aluminum because aluminum is lightweight and has sufficient thermal conductivity to withdraw heat away from the fuel cell.

Response to Arguments

11. Applicant's arguments filed 12/16/2004 have been fully considered but they are not persuasive.

With respect to applicant's assertions that Yoshimura et al. ('094) is silent that the electrically conductive paste is effective for bonding the two plates, the Examiner disagrees for reasons given above which are reiterated herein for applicant's convenience.

Applicant on page 28 of the instant specification states that in the case of where the thermally expanding graphite or any electrically conductive paste is used for the filler, the filler itself has integrity to allow the two metal plates to be readily bonded to each other by pressing and that electrically conductive pastes include adhesives containing carbon powder.

Since carbon paste is an electrically conductive adhesive as recognized by applicant on page 28 of the instant specification and those of ordinary skill in the art, the carbon paste inherently bonds the two plates of the gas separator to one another. Furthermore, applicant himself states on page 28 of the instant specification that electrically conductive pastes are adhesives containing carbon powder (i.e., carbon paste).

With respect to applicant's assertions that the '094 reference fails to suggest an outer exposed coating layer formed on at least one of the plates and in contact with the at least one of the plates as recited in claims 27 and 28 and instead an intermediate layer 65 is interposed between a plate 65 and an outer exposed layer 64, the Examiner disagrees for reasons given above which are reiterated in herein for applicant's convenience.

The Yoshimura et al. reference discloses at Figure 6 which shows in examples (b) and (c) gas separators that are not coated with the second coating layer of thermal expansion graphite coating such that the gas separators have only the first coating layer of either tin or nickel as shown in Figure 6 and as discussed in col. 10, lines 3-30 of the reference. In Figure 7 of the Yoshimura et al. reference, a fuel cell uses only a gas separator coated with a single tin layer and not with a second layer of thermal expansion graphite (col. 10, lines 31-45).

With respect to Cisar et al., applicant asserts that Cisar is completely silent with regard to a filler member located in a concavity defined between two plates, the member being electrically conductive and effective to bond the two plates to one another, or an outer exposed coating layer formed on at least one of the plates and in contact with the at least one of the plates as required by the claims. In response, the Examiner disagrees because the aluminum alloy substrate is the filler member between the two metal plates that are deposited thereon as stated above.

Cisar et al. state that the two plates (nickel plated layers on the aluminum substrate) are further coated with a single outermost layer of gold (col. 6, lines 65-67). The member made of aluminum alloy is electrically and thermally conductive. As seen in Figure 2 of Cisar et al., the aluminum substrate alloy fills the concavities of the metal plated layers.

Cisar et al. also disclose that there is excellent adhesion between the deposited metal layers and aluminum alloy substrates (the filler member) (col. 7, lines 30-47).

With respect to Wilkinson et al., applicant asserts that Wilkinson et al. in combination with Adlhart do not suggest a filler member located in a concavity defined between two plates, the member being electrically conductive and effective to bond the two plates to one another and an outer exposed coating layer formed on at least one of the plates and in contact with the at least one of the plates as required by the claims.

In response, as stated by the Examiner above, the intermediate metal foil layer of Wilkinson et al. is effective to bond the two outer layers of soft, electrically conductive metal layers such as copper and niobium through embossing. The embossing step provides for concavities that are filled by the intermediate metal foil layer. Furthermore, as stated above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a single outer coat layer of a wetting agent of Aldhart to the surfaces of the gas separator of Wilkinson et al. in order to render the rugged shapes plates hydrophilic which would remove water from the fuel cell produced during the operation of the fuel cell to prevent fuel cell flooding (col. 6, lines 3-22).

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication or earlier communications should be directed to examiner Susy Tsang-Foster, Ph.D. whose telephone number is (571) 272-1293. The examiner can normally be reached on Monday through Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at (571) 272-1292.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

st/ Susy Tsang-Foster

Susy Tsang-Foster
Primary Examiner
Art Unit 1745